

AMENDMENTS TO THE CLAIMS:

Please amend the claims as follows:

1-41. (Cancelled)

42. (New) A photomask comprising, on a transparent substrate:

a semi-shielding portion having a transmitting property against exposing light;

a transparent portion surrounded with said semi-shielding portion and having a transmitting property against the exposing light; and

an auxiliary pattern surrounded with said semi-shielding portion and provided around said transparent portion,

wherein part of said semi-shielding portion is interposed between said transparent portion and said auxiliary pattern,

said transparent portion is smaller than a rectangle with a side of $(0.8 \times \lambda \times M)/NA$,

said auxiliary pattern is a rectangular pattern and has a center line thereof in a position away from the center of said transparent portion by a distance not less than $(0.3 \times \lambda \times M)/NA$ and not more than $(0.5 \times \lambda \times M)/NA$,

said semi-shielding portion and said transparent portion transmit the exposing light in an identical phase with respect to each other,

said auxiliary pattern transmits the exposing light in an opposite phase with respect to said semi-shielding portion and said transparent portion and is not transferred through exposure, and

λ indicates a wavelength of the exposing light, and M and NA respectively indicate magnification and numerical aperture of a reduction projection optical system of a projection aligner.

43. (New) The photomask of Claim 42,

wherein said auxiliary pattern has a width not less than $(0.05 \times \lambda \times M)/(NA \times T^{0.5})$ and not more than $(0.2 \times \lambda \times M)/(NA \times T^{0.5})$, wherein T indicates relative transmittance of said auxiliary pattern to said transparent portion.

44. (New) The photomask of Claim 42,

wherein said auxiliary pattern has a center line thereof in a position away from the center of said transparent portion by a distance not less than $(0.365 \times \lambda \times M)/NA$ and not more than $(0.435 \times \lambda \times M)/NA$.

45. (New) The photomask of Claim 44,

wherein said auxiliary pattern has a width not less than $(0.1 \times \lambda \times M)/(NA \times T^{0.5})$ and not more than $(0.15 \times \lambda \times M)/(NA \times T^{0.5})$, wherein T indicates relative transmittance of said auxiliary pattern to said transparent portion.

46. (New) The photomask of Claim 42,

wherein said transparent portion has a rectangular, polygonal or circular shape.

47. (New) The photomask of Claim 42,

wherein said auxiliary pattern consists of four rectangular patterns.

48. (New) A photomask comprising, on a transparent substrate:

a semi-shielding portion having a transmitting property against exposing light;

a transparent portion surrounded with said semi-shielding portion and having a transmitting property against the exposing light; and

an auxiliary pattern surrounded with said semi-shielding portion and provided around said transparent portion,

wherein part of said semi-shielding portion is interposed between said transparent portion and said auxiliary pattern,

said transparent portion is in the shape of a line with a width in a short side direction smaller than $(0.65 \times \lambda \times M)/NA$,

said auxiliary pattern is a rectangular pattern and has a center line thereof in a position away from the center of said transparent portion by a distance not less than $(0.25 \times \lambda \times M)/NA$ and not more than $(0.45 \times \lambda \times M)/NA$,

said semi-shielding portion and said transparent portion transmit the exposing light in an identical phase with respect to each other,

said auxiliary pattern transmits the exposing light in an opposite phase with respect to said semi-shielding portion and said transparent portion and is not transferred through exposure, and

λ indicates a wavelength of the exposing light, and M and NA respectively indicate magnification and numerical aperture of a reduction projection optical system of a projection aligner.

49. (New) The photomask of Claim 48,

wherein said transparent portion has a longitudinal dimension of $(2 \times \lambda \times M)/NA$ or more.

50. (New) The photomask of Claim 48,

wherein said auxiliary pattern has a width not less than $(0.05 \times \lambda \times M)/(NA \times T^{0.5})$ and not more than $(0.2 \times \lambda \times M)/(NA \times T^{0.5})$, wherein T indicates relative transmittance of said auxiliary pattern to said transparent portion.

51. (New) The photomask of Claim 48,

wherein said auxiliary pattern has a center line thereof in a position away from the center of said transparent portion by a distance not less than $(0.275 \times \lambda \times M)/NA$ and not more than $(0.425 \times \lambda \times M)/NA$.

52. (New) The photomask of Claim 51,
wherein said auxiliary pattern has a width not less than $(0.1 \times \lambda \times M)/(NA \times T^{0.5})$ and not more than $(0.15 \times \lambda \times M)/(NA \times T^{0.5})$, wherein T indicates relative transmittance of said auxiliary pattern to said transparent portion.

53. (New) The photomask of Claim 48,
wherein said auxiliary pattern is disposed in parallel to said transparent portion along a line direction of said transparent portion, and
said transparent portion has a line end protruded beyond said auxiliary pattern by a given or larger dimension along the line direction.

54. (New) The photomask of Claim 53,
wherein said given dimension is $(0.03 \times \lambda \times M)/NA$.

55. (New) The photomask of Claim 42,
wherein a transmittance of said semi-shielding portion is 3% or more and 15% or less with respect to said exposing light.

56. (New) The photomask of Claim 42,
wherein a transmittance of said auxiliary pattern with respect to said exposing light is larger than at least the transmittance of said semi-shielding portion.

57. (New) The photomask of Claim 42,
wherein a transmittance of said auxiliary pattern with respect to said exposing light is equivalent to a transmittance of said transparent portion.

58. (New) The photomask of Claim 42,
wherein said transparent portion is formed by exposing said transparent substrate,
said auxiliary pattern is formed by depositing, on said transparent substrate, a first phase shift film that causes, in the exposing light, a phase difference in an opposite phase with respect to said transparent portion, and

said semi-shielding portion is formed by depositing, on said first phase shift film, a second phase shift film that causes, in the exposing light, a phase difference in an opposite phase with respect to said first phase shift film.

59. (New) The photomask of Claim 42,
wherein said transparent portion is formed by exposing said transparent substrate,
said auxiliary pattern is formed by trenching said transparent substrate by a depth for causing, in the exposing light, a phase difference in an opposite phase with respect to said transparent portion, and

said semi-shielding portion is formed by depositing, on said transparent substrate, a semi-shielding film that transmits the exposing light in an identical phase with respect to said transparent portion.

60. (New) The photomask of Claim 42,
wherein said transparent portion is formed by exposing said transparent substrate,
said auxiliary pattern is formed by trenching said transparent substrate by a depth for causing, in the exposing light, a phase difference in an opposite phase with respect to said transparent portion, and

said semi-shielding portion is formed by depositing, on said transparent substrate, a metal thin film that transmits the exposing light in an identical phase with respect to said transparent portion.

61. (New) The photomask of Claim 42,
wherein said auxiliary pattern is formed by exposing said transparent substrate,
said transparent portion is formed by trenching said transparent substrate by a depth for
causing, in the exposing light, a phase difference in an opposite phase with respect to said
auxiliary pattern, and

said semi-shielding portion is formed by depositing, on said transparent substrate, a phase
shift film that causes, in the exposing light, a phase difference in an opposite phase with respect
to said auxiliary pattern.

62. (New) A photomask comprising, on a transparent substrate:
a semi-shielding portion having a transmitting property against exposing light;
a first transparent portion surrounded with said semi-shielding portion and having a
transmitting property against the exposing light;

an auxiliary pattern surrounded with said semi-shielding portion and provided around
said first transparent portion, and

a second transparent portion surrounded with said semi-shielding portion and having a
transmitting property against the exposing light,

wherein part of said semi-shielding portion is interposed between said first transparent
portion and said auxiliary pattern,

said auxiliary pattern includes a first auxiliary pattern disposed in an area sandwiched
between said first transparent portion and said second transparent portion and a second auxiliary
pattern disposed in the other area,

said semi-shielding portion and said first and second transparent portions transmit the
exposing light in an identical phase with respect to each other, and

said auxiliary pattern transmits the exposing light in an opposite phase with respect to said semi-shielding portion and said first and second transparent portions and is not transferred through exposure.

63. (New) The photomask of Claim 62,

wherein said first auxiliary pattern is adjacent to a different auxiliary pattern spaced by a given or smaller distance with said semi-shielding portion sandwiched therebetween,

said second auxiliary pattern is not adjacent to a different auxiliary pattern spaced by said given or smaller distance with said semi-shielding portion sandwiched therebetween, and

said first auxiliary pattern has a smaller width than said second auxiliary pattern.

64. (New) The photomask of Claim 63,

wherein said first auxiliary pattern includes a first pattern that is away from the adjacent different auxiliary pattern by a distance $G1$ and a second pattern that is away from the adjacent different auxiliary pattern by a distance $G2$, and

in the case where $(0.5 \times \lambda \times M)/NA > G1 > G2$, said second pattern has a smaller width than said first pattern, wherein λ indicates a wavelength of the exposing light, and M and NA respectively indicate magnification and numerical aperture of a reduction projection optical system of a projection aligner.

65. (New) The photomask of Claim 64,

wherein a difference between the width of said first pattern and the width of said second pattern is in proportion to a difference between the distance $G1$ and the distance $G2$.

66. (New) The photomask of Claim 62,

wherein said first transparent portion is smaller than a rectangle with a side of $(0.8 \times \lambda \times M)/NA$, wherein λ indicates a wavelength of the exposing light, and M and NA respectively indicate magnification and numerical aperture of a reduction projection optical system of a projection aligner.

67. (New) The photomask of Claim 66,

wherein said first transparent portion and said second transparent portion are adjacent to each other spaced by a given or smaller distance, and

said first auxiliary pattern has a smaller area than said second auxiliary pattern.

68. (New) The photomask of Claim 67,

wherein said given distance is $(1.3 \times \lambda \times M)/NA$.

69. (New) The photomask of Claim 66,

wherein said first transparent portion is close to said second transparent portion spaced by a distance of a given range at least along a first direction and is not close to a different transparent portion spaced by a distance of said given range at least along a second direction,

said first auxiliary pattern is disposed around said first transparent portion along said first direction,

said second auxiliary pattern is disposed around said first transparent portion along said second direction,

said given range is from $(1.15 \times \lambda \times M)/NA$ to $(1.45 \times \lambda \times M)/NA$, and

said first auxiliary pattern is farther from said first transparent portion than said second auxiliary pattern.

70. (New) The photomask of Claim 66,

wherein said first transparent portion is close to said second transparent portion spaced by a distance of a given range at least along a first direction and is not close to a different transparent portion spaced by a distance of said given range at least along a second direction,

said first auxiliary pattern is disposed around said first transparent portion along said first direction,

said second auxiliary pattern is disposed around said first transparent portion along said second direction,

said given range is from $(0.85 \times \lambda \times M)/NA$ to $(1.15 \times \lambda \times M)/NA$, and

said first auxiliary pattern is closer to said first transparent portion than said second auxiliary pattern.

71. (New) The photomask of Claim 62,

wherein said first transparent portion is in the shape of a line with a width in a short side direction smaller than $(0.65 \times \lambda \times M)/NA$, wherein λ indicates a wavelength of the exposing light, and M and NA respectively indicate magnification and numerical aperture of a reduction projection optical system of a projection aligner.

72. (New) The photomask of Claim 71,

wherein said first transparent portion has a longitudinal dimension of $(2 \times \lambda \times M)/NA$ or more.

73. (New) The photomask of Claim 71,

wherein said first transparent portion and said second transparent portion are adjacent to each other spaced by a given or smaller distance, and

said first auxiliary pattern has a smaller width than said second auxiliary pattern.

74. (New) The photomask of Claim 71,
wherein said first transparent portion and said second transparent portion are adjacent to each other spaced by a given or smaller distance, and

said first auxiliary pattern has a smaller area than said second auxiliary pattern.

75. (New) The photomask of Claim 73,
wherein said given distance is $(1.15 \times \lambda \times M)/NA$.

76. (New) The photomask of Claim 71,
wherein said first transparent portion is close to said second transparent portion spaced by a distance of a given range at least along a first direction and is not close to a different transparent portion spaced by a distance of said given range at least along a second direction,

said first auxiliary pattern is disposed around said first transparent portion along said first direction,

said second auxiliary pattern is disposed around said first transparent portion along said second direction,

said given range is from $(1.0 \times \lambda \times M)/NA$ to $(1.3 \times \lambda \times M)/NA$, and

said first auxiliary pattern is farther from said first transparent portion than said second auxiliary pattern.

77. (New) The photomask of Claim 71,

wherein said first transparent portion is close to said second transparent portion spaced by a distance of a given range at least along a first direction and is not close to a different transparent portion spaced by a distance of said given range at least along a second direction,

said first auxiliary pattern is disposed around said first transparent portion along said first direction,

said second auxiliary pattern is disposed around said first transparent portion along said second direction,

said given range is from $(0.7 \times \lambda \times M)/NA$ to $(1.0 \times \lambda \times M)/NA$, and

said first auxiliary pattern is closer to said first transparent portion than said second auxiliary pattern.